HEAT PUMP SWIMMING POOL HEATERS

Owners Manual

OFFICES - AUSTRALIA

NSW - Sydney
(HEAD OFFICE)
Tel : +61 2 9898 8686

VIC/ TAS - Melbourne
Tel : +61 3 9764 1211

WA - Perth
Tel : +61 8 9273 1900

QLD - Brisbane
Tel : +61 7 3299 9900

SA/ NT - Adelaide
Tel : +61 8 8244 6000

ACT Distributor
Tel : +61 2 6280 6476

OFFICES - OVERSEAS

Waterco (USA) Inc
Phoenix, Arizona, USA
Tel : +1 623 434 4703

Waterco USA
Augusta, USA
Tel : +1 706 793 7291

Waterco Canada
Quebec, Canada
Tel : +1 450 796 1421

Waterco (Europe) Limited
Radfield, Kent, UK
Tel : +44(0) 1795 521 733

Waterco (NZ) Limited
Auckland, New Zealand
Tel : +64 9 525 7570

Waterco (GZ) Limited
Guangzhou, China
Tel : +8620 3222 2180

Waterco (Far East) Sdn. Bhd.
Kuala Lumpur
Tel : +60 3 6145 6000

PT Waterco Indonesia
Jakarta, Indonesia
Tel : +62 21 4585 1481

⚠WARNING This equipment must be installed and serviced by a qualified technician. Improper installation can create electrical hazards which could result in property damage, serious injury or death. Improper installation will void the warranty.

Notice to Installer
This manual contains important information about the installation, operation and safe use of this product. Once the product has been installed **this manual must be given to the owner/ operator of this equipment.**

WATERCO
Waterco Limited ABN 62 002 070 733

Member WATER QUALITY ASSOCIATION

WATERCO
Water, the Liquid of Life

www.waterco.com

(W99227) 01/2007

Table of Contents

A NOTE TO YOU ---------- 01

GENERAL SAFETY INSTRUCTIONS ---------- 02

COMPONENTS DESCRIPTION ---------- 04

INSTALLATION INSTRUCTIONS ---------- 05

GETTING TO KNOW YOUR POOL HEATER ---------- 10

CARING FOR YOUR POOL HEATER ---------- 14

TROUBLESHOOTING ---------- 16

WARRANTY ---------- 18

ELECTRICAL DIAGRAMS ---------- 19

A NOTE TO YOU

Thank you for buying our Waterco Heat Pump Pool Heater

A heat pump pool heater is a highly efficient, cost effective method of pool heating. Intelligent operation and care will result in many years of enjoyment and pleasure.

The Waterco heat pump is a self contained unit designed specifically for pool heating. The unit operates on the proven principle of heat pump technology. Using the latest technology in heat collection available, the Earth and its atmosphere, the heat pump processes the sun's free energy extracting heat from the sun warmed air and transferring it efficiently to the pool water. Because the heat pump moves the free heat from the outside air to the pool water, rather than create heat, as a fossil fuel or electric resistance heater does, the heat pump can heat your swimming pool with up to 80% lower operating costs than other less efficient heaters, while maintaining your water temperature at all times during the pool heating season.

In general, compared to other types of pool heaters such as gas or oil fired, the heat pump has a lower heating capacity on a kW/hr basis. Therefore, it will be required to operate longer to accomplish the desired results. At certain times, it may be necessary to run the heat pump up to 24 hours per day. However, this should not be of concern to the owner because the heater is designed to operate continuously. Even though it may operate continuously for many hours, it will still heat the pool with far greater economy than other types of heaters.

As with all pool heaters, you are advised to use a pool cover at night and when the pool is not in use. This will keep evaporation, the greatest source of heat loss, to a minimum, greatly reducing the overall pool heating costs. During warmer weather, the pool cover may not be required.

GENERAL SAFETY INSTRUCTIONS

We care for our customers

We have provided important safety messages in this manual and on your heater. Always read and follow all safety messages.

⚠WARNING

This is the safety alert symbol.
This symbol alerts you to hazards that can kill or hurt you and others.

⚠ VITAL

This is a very important label.
This symbol alerts you of things that MUST be strictly adhered to in order to ensure that your warranty will not be voided.

☞ IMPORTANT

These are things that must be respected in order to protect the health of swimmers and to ensure that your warranty will not be voided.

To find detailed product information or the location of your nearest Waterco dealer, please visit our website at
www.waterco.com

⚠WARNING

All electrical connections must be done by a qualified electrician, according to the local electrical codes. Always cut off the unit's main power whenever the access panel is open or removed. Always install the machine outdoors (unless approved by the manufacturer), while respecting the minimal clearances needed for proper operation and heating.

☞ IMPORTANT

PROPER POOL CHEMISTRY IS VITAL TO THE LIFE OF YOUR HEATER. PAY PARTICULAR ATTENTION TO THE **TOTAL ALKALINITY AND TOTAL DISSOLVED SOLIDS**. IT IS HIGHLY RECOMMENDED THAT YOU HAVE YOUR POOL CHEMISTRY CHECKED OFTEN BY AN OUTSIDE INDEPENDENT POOL STORE.

Water quality standards that must be strictly adhered to:

DESCRIPTION	NORMAL RANGE*	VERIFY
PH Level	7.4 to 7.8	1 / week
Chlorine Concentration	1.0 to 4.0 PPM	1 / 2-3 days
Total Alkalinity	100 to 120 PPM	1 / 2-3 weeks
Total Dissolved Solids	below 1800 PPM *Reg. Pool*	1 / month
	below 3500 PPM *Salt. Pool*	1 / month
Calcium Hardness	200 to 300 PPM	1 / month

⚠ VITAL

MAKE SURE THE INSTALLATION WAS DONE ACCORDING TO THE INSTRUCTIONS OF THIS MANUAL. SEE "INSTALLATION" SECTION.

MAKE SURE YOUR HEATER WAS PROPERLY GROUNDED AND BONDED. SEE "BONDING" AND "BONDING DIAGRAM" SECTIONS.

At the beginning of each season you must properly balance your water according to the standards prescribed on the previous page **BEFORE** circulating water inside the heat pump.

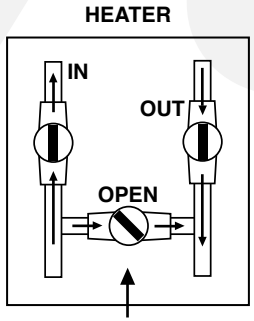
⚠ VITAL

BYPASS SETUP

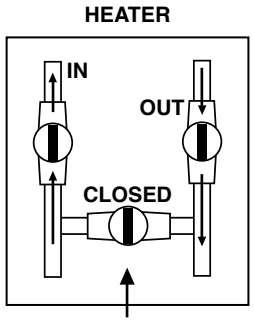
NOTE: *It is mandatory that a bypass system is installed on all heat pump installations. This allows for flow adjustment during various seasons, as well as disconnecting the unit for servicing.*

Adjustment of the bypass valves

The adjustment may vary according to the pool pump size and the climatic conditions.



Cold Water
Approximately 60% of the water through the unit, 40% bypassed.
FOR TEMPERATURES BELOW 20°C

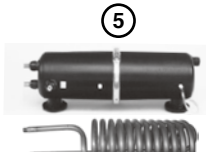


Hot Water
100% of the water is circulating in the unit.
FOR TEMPERATURES ABOVE 20°C

- During the cooler months, the unit may need to run 24hrs/day to maintain the set temperature. Keep the bypass set to 60/40 during cold temperatures.
- Do not keep the bypass open when the water temperature is above 20°C. This will cause the unit to cut out on high pressure.
- The recommended flow rate through the heat pump ranges between 113 and 300 lpm.
- If the servicing pump provides flow rates greater than 300 lpm - excess flow will need to be bypassed back to the pool.

COMPONENTS DESCRIPTION

1. Heat Control
2. Evaporator
3. Cabinet
4. Fan and Motor
5. Heat Exchanger
6. Compressor



Inside the heater

Inside the heater

INSTALLATION INSTRUCTIONS

Location

The location of the pool heater is very important in keeping installation costs to a minimum, while providing for maximum efficiency of operation as well as allowing adequate service and maintenance access.

The unit is designed for outdoor installation and should not be installed in a totally enclosed area such as a shed, garage, etc. unless ventilation is provided to ensure adequate air exchange for proper operation. Re-circulation of cold discharged air back into the evaporator coil will greatly reduce unit heating capacity and efficiency.

The unit should be located as close as possible (3.0m is ideal) to the existing pool pump and filter to minimize water piping. The use of 90 degree bends and short radius elbows in the water piping should be kept to a minimum.

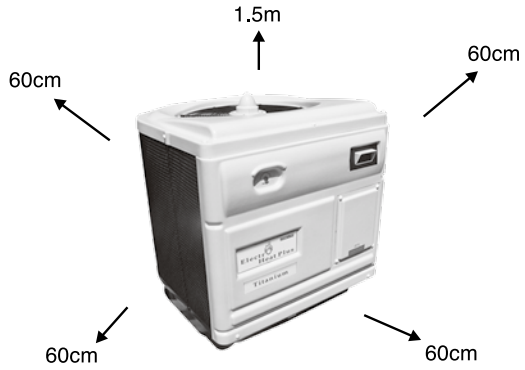
Mount the unit on a sturdy base, preferably a concrete slab or blocks. The base should be completely isolated from the building foundation or wall to prevent the possibility of sound or vibration transmission into the building. The size of the base should not be less than the base of the pool heater.

CLEARANCES

☞ IMPORTANT

Waterco models discharge air from the top of the unit. Air is pulled through the evaporator coil and discharged through the grille. Clearance should be allowed in front and around the unit for unrestricted air discharges and service access.

Vertical air discharge models



Water Piping

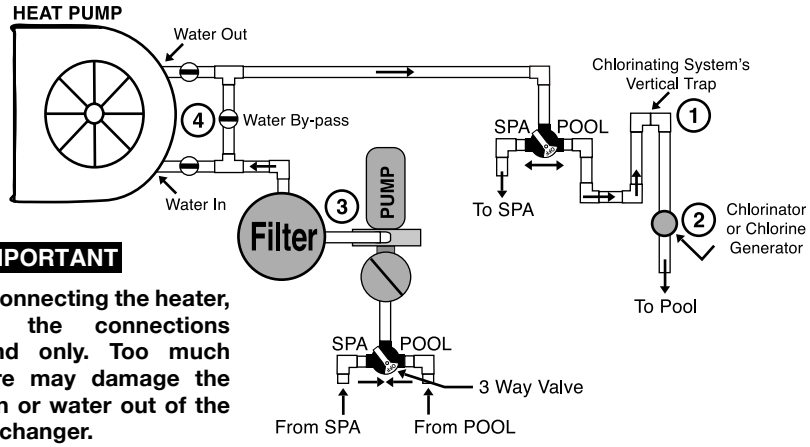
The piping sequence: pool pump / filter / heater / pool (inline chlorinators, if used, must be downstream (after the heater) to minimise harm to the pool equipment). Rigid PVC piping is recommended, all joints should be glued with PVC glue. If rigid PVC is not available, you can use soft or flexible piping with stainless steel clamps. When the piping installation is complete, operate the pool pump and check the system for leaks. Then check the filter pressure gauge to see that excessive head pressure is not indicated.

IMPORTANT

NOTE: *If a solar installation, or pool cleaner is installed in the system, it is recommended to use a dedicated pump for the heater. This will maintain sufficient flow through the unit.*

Plumbing Diagram

VITAL



IMPORTANT

When connecting the heater, tighten the connections by hand only. Too much pressure may damage the water in or water out of the heat exchanger.

1. Any kind of Automatic Chlorination System MUST be installed after (downstream) of the Heat Pump.

2. Filter MUST be connected before (upstream) the Heat Pump.

Piping

The piping and plumbing between the heat pump and other equipment should be minimised. During colder months, significant heat loss will occur through the piping. If excessive pipe work is involved - the piping should be insulated to minimise heat loss.

Flow Check Valve

This is concerned with the installation of heat pumps below the pool water level. The heat pump operates on a pressure switch that activates the unit when the pool pump is switched on.

If the heat pump is installed more than 1.5 metres below the pool water level, the weight of the water keeps the pressure switch activated and the heat pump running - even when the pool pump is switched off.

In this situation, to prevent the heat pump running when the pool pump is switched off, a flow check valve must be installed in-line with the pressure switch.

Installation Above Water Level

For installations where the heat pump is installed above water level, installers must ensure that sufficient water flow is diverted to the heat pump. Flow is detected by the pressure switch. If the volume of water passing through the heat pump is insufficient, the pressure switch will not activate and will not turn on the unit.

Three Phase Connections

When installing the three phase heat pumps, the electrician must ensure at all times that the connections are done according to the tags placed on the wires. The wiring is tagged: L1, L2, L3, and N.

It is essential that the electrician installing three phase heat pumps is present when the units are started up for the first time.

Wrongly connected heat pumps are indicated by the compressor running backwards, and making excessive noise after the 3 minute time delay. This can damage the compressor if it is left to run.

If this occurs, the unit should be turned off immediately, and the wiring should be changed by swapping any two (2) phases to fix the problem - one phase needs to stay in the same position.

This is necessary as certain households / properties may have three phase power supplies that are not wired to Australian standards.

Electrical

IMPORTANT

To ensure your safety and ensure the adequate functioning of your heat pump, **all electrical work should be performed by a fully qualified and licensed electrician in accordance with local electrical codes.**

An adequate and dedicated circuit breaker and copper wiring must be used. Refer to the electrical installation diagram found on the inside of the access panel.

⚠WARNING **THE UNIT MUST BE DISCONNECTED BEFORE OPENING THE ACCESS PANEL.**

Electrical Connection

Standard power supply : 208/240 v - 60hz-1 phase
Optional power supply : 208/240 v - 50hz-1 phase
380/420 v - 50/60 hz - 3 phase
200/230 v - 50/60hz - 3 phase

MODELS	POWER SUPPLY	BREAKER (Amps)	Running (Amps)	* ELECTRIC WIRE SIZE mm² (A WG)
55	Single Phase	40	25	5.3 (10)
80	Single Phase	40	30	5.3 (10)
85	Single Phase	40	31	5.3 (10)
	Three Phase*	16	7	4 (12)
105	Three Phase*	16	13	4 (12)
125	Three Phase*	20	13.5	4 (12)
150	Three Phase*	25	16	4 (12)

NOTE: Three phase currents are measured per phase.

⚠WARNING

The power cable ground must be connected to the electrical panel and to the ground lug of the heat pump. An improper installation may be a potential cause of fire, electrical shock or injury.

Bonding

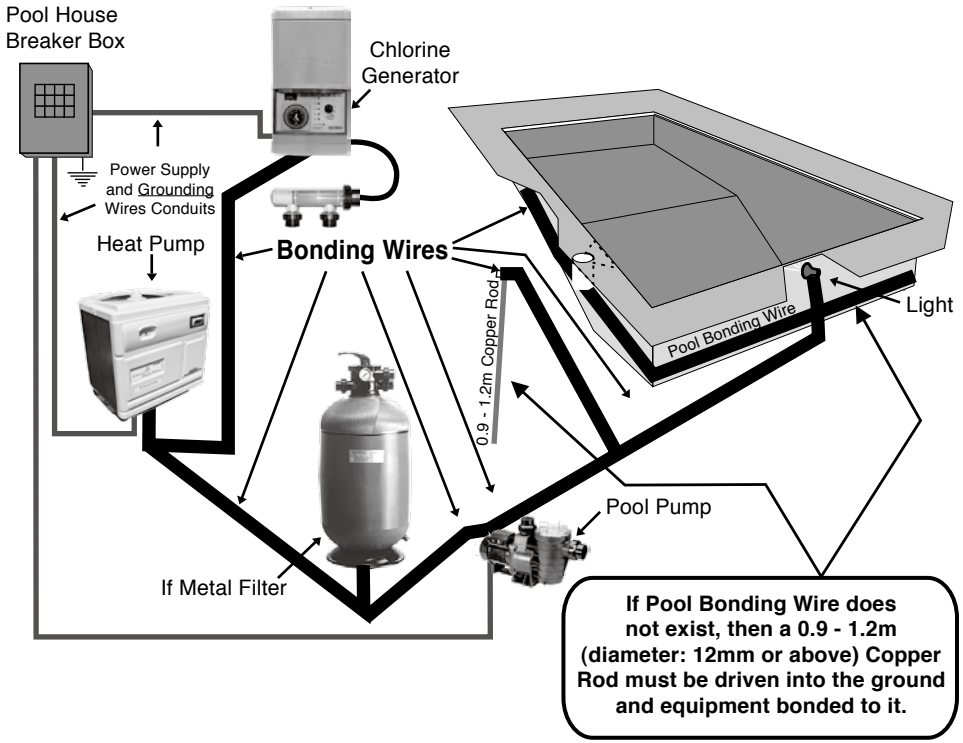
⚠ VITAL

Because all metals have different electrical potentials, ALL metal and electrical components of the pool system MUST be bonded together. This includes the metal framework of the pool, the light, the pump, the filter (if metal), the heater, any automatic chlorine generator, and any other metal or electrical equipment.

On some older pools, this substructure bond wire may not exist. In these cases, a 0.9 - 1.2m solid copper rod must be driven into the ground near the equipment, all electric equipment and metal components must be bonded to each other and to the copper rod. Warranty will be void if the system is not properly bonded.

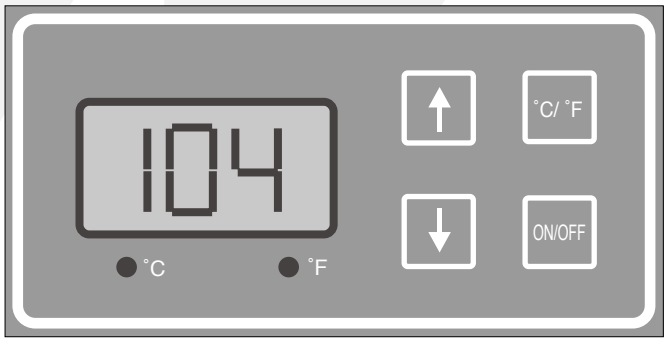
Bonding Diagram

⚠ VITAL



GETTING TO KNOW YOUR POOL HEATER

Operation of Digital Control



Digital Control Panel

The digital display, electronic temperature control always displays the water temperature setting. To power on the temperature control, press the ON/OFF button.

To modify the desired water temperature, simultaneously press on the Up and Down control arrows on the keypad or until the temperature display flashes. The arrows will raise (up arrow) or lower (down arrow) the temperature setting. Once the display no longer flashes, the desired temperature is now set. To change the temperature display mode, press on the °C/ °F button.

Temperature Differential

It is possible for a temperature variation to occur between the probe and the pool thermostat measurement, i.e., the value displayed is different from the temperature displayed on the pool thermometer. Example: if the water is at 26°C and the heat pump displays 24°C.

To calibrate this variation, perform the following procedure;

- Read the pool water temperature (ex: 26°C),
- Now read the temperature displayed on the heat pump thermostat (24°C),
- Therefore we must raise the heat pump reading by 2°C.

To calibrate the probe perform the following procedure;

- Enter the digital programming mode by simultaneously pressing on the up and down arrows,
- Once the temperature displayed is flashing press on the ON/OFF button,
- The display will now show the calibration value, which varies between -4°C and +4°C,
- Using the up and down arrows, enter the calibration value, 2°C. The degree function will flash for negative values and will not flash for positive values.
- Once the calibration has been entered wait until the new temperature appears.

To Start-Up the unit

When the unit is turned on or after a power shut down, the panel lights up and either indicates OFF or the temperature of the pool water circulating inside the heater. Program in the desired pool water temperature.

Once programmed the fan starts and the compressor will start after a 3 minute delay.

NOTE: The fan motor and the compressor will start at the same time when the unit has been stopped for a long period.

To Stop the unit

The unit can be stopped by switching off the electrical power supply or by programming the desired water temperature below the actual pool water temperature.

Initial Heating

The speed of heating is dependent upon five basic factors:

1. Size of the pool.
2. How many degrees the water is to be heated.
3. Ambient air temperature - the warmer the air the less time is required to heat.
4. Use of a solar blanket (see the following section).
5. The size of the heater.

To achieve initial heating your pool heater and pool pump may work up to 24 hours per day until desired temperature is achieved. The initial heating time may vary depending upon the above five factors. After initial heating, operating time may be reduced to match daily heat loss.

Pool Solar Blanket

A pool solar blanket should be used whenever possible. Blankets minimise heat loss and conserve heat in your pool. Like a jacket holds body heat in on a chilly day, or closed doors and windows hold heat in a home, the blanket controls heat losses. Un-blanketed pools lose 2-3 times more heat than blanketed pools. Pool blankets can also reduce evaporation of the pool water by 90%.

Heater Running Time

Most units should be sized to operate during the pool filtering cycle time of 8-12 hours daily, providing an even, steady flow of warm water. On warmer days the heater will run less because the heat loss will be less. Heat pump pool heaters are able to operate 24 hours per day when necessary.

Defrost Cycle

When the ambient air temperature is between 3˚C and 7˚C, or if the evaporator is dirty or clearances are not respected, condensation water on the fins of the evaporator tends to frost. In such cases the control will activate the defrost cycle until all the frost is gone. A normal defrost cycle (compressor stopped) lasts between 5 and 10 minutes. The pool heater will not be damaged if it is running at less than 7˚C. In these conditions, the unit will have more frequent defrosting cycles.

Protection Devices

The integrity and performance of your pool heater and its components is protected by controls. In normal use, the unit should never reach the thermal protection level. However, should it happen, you should verify your operating conditions as described below.

The heat pump is designed to operate with a minimum water circulation of 113lpm. The high pressure switch will shut off the compressor if there is not sufficient water flow through the unit. Check for dirty filters, clogged skimmers or the bypass valve position. They are usually the cause of this condition.

The heat pump also has a built-in water pressure switch that will interrupt the operation of your unit should water circulation through the unit stop. If there is still a demand for heat, turn on your pool pump and the heater will start up once the normal water flow is re-established.

Your heat pump pool heater features other protection devices that could stop the unit:

- High pressure cut-out switch,
- Low pressure cut-out switch,
- Thermal protection for the compressor and the fan motor

CARING FOR YOUR POOL HEATER

The Waterco heat pump has been specifically engineered to give you many years of satisfaction. To clean the plastic surfaces use soapy water and a clean soft cloth. Never use solvents or abrasives.

The dirt collected in the evaporators can be removed with a gentle water spray and the use of a soft brush. Be careful not to damage the aluminum fins. Do not use a pressure washer to clean the evaporator as it can damage the fins.

Winterising

⚠ VITAL

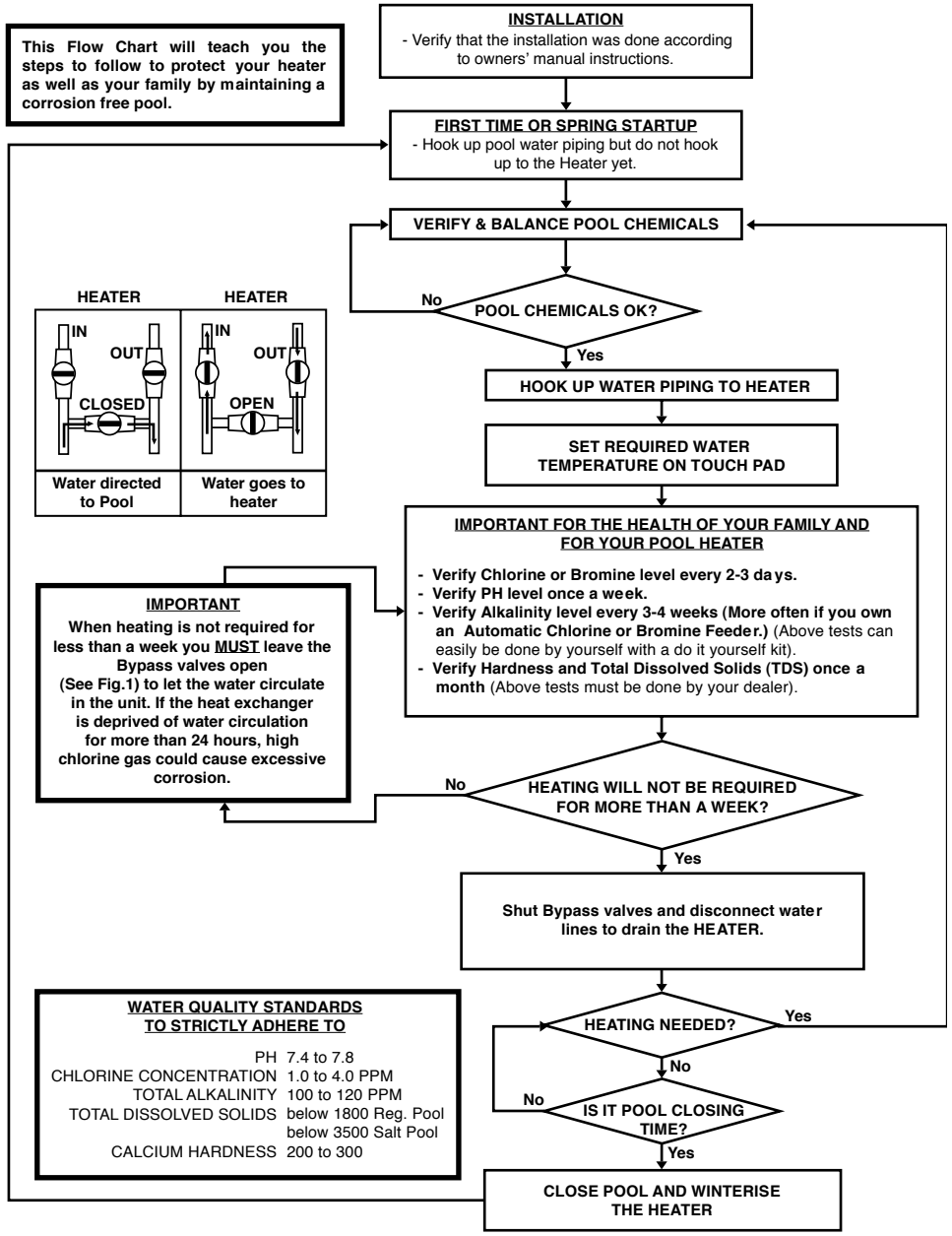
Set the water temperature setting to **OFF**. Turn the pool heater breaker OFF. If the unit is stored in a place where the temperature drops below the freezing point of 0˚C, **it is mandatory that the water accumulated in the unit be drained completely before freezing weather prevails.** The water piping **MUST** be disconnected to drain the heat exchanger in preparation for winter. Once the piping is disconnected, the unit **MUST** be drained of all its water by tipping it (75˚). It is recommended to flush the inside of the heat exchanger with the garden hose and to drain the unit again. Using 2 pool return caps, block the water in and water out to prevent any intrusion. **Do Not** leave the water piping connected to the heater over the winter.

DO NOT put anything under the water connections of the unit when lifting it up. This can keep water inside the heater and cause freezing damages.

Unit may be covered for the winter. The use of a material that will allow air to go inside the heater is recommended.

It is also possible to fill the heat exchanger with pool anti-freeze only, but ensure that the anti-freeze contains an elevated pH to prevent corrosion. This is optional and requires appropriate hardware.

How To Protect Your Pool Heater


This Flow Chart will teach you the steps to follow to protect your heater as well as your family by maintaining a corrosion free pool.
INSTALLATION
- Verify that the installation was done according to owners' manual instructions.
FIRST TIME OR SPRING STARTUP
- Hook up pool water piping but do not hook up to the Heater yet.
VERIFY & BALANCE POOL CHEMICALS
No
POOL CHEMICALS OK?
Yes
HEATER
HEATER
IN
OUT
CLOSED
IN
OUT
OPEN
Water directed to Pool
Water goes to heater
HOOK UP WATER PIPING TO HEATER
SET REQUIRED WATER TEMPERATURE ON TOUCH PAD
IMPORTANT FOR THE HEALTH OF YOUR FAMILY AND FOR YOUR POOL HEATER
- Verify Chlorine or Bromine level every 2-3 days.
- Verify PH level once a week.
- Verify Alkalinity level every 3-4 weeks (More often if you own an Automatic Chlorine or Bromine Feeder.) (Above tests can easily be done by yourself with a do it yourself kit).
- Verify Hardness and Total Dissolved Solids (TDS) once a month (Above tests must be done by your dealer).
IMPORTANT
When heating is not required for less than a week you MUST leave the Bypass valves open (See Fig.1) to let the water circulate in the unit. If the heat exchanger is deprived of water circulation for more than 24 hours, high chlorine gas could cause excessive corrosion.
No
HEATING WILL NOT BE REQUIRED FOR MORE THAN A WEEK?
Yes
Shut Bypass valves and disconnect water lines to drain the HEATER.
WATER QUALITY STANDARDS TO STRICTLY ADHERE TO
PH 7.4 to 7.8
CHLORINE CONCENTRATION 1.0 to 4.0 PPM
TOTAL ALKALINITY 100 to 120 PPM
TOTAL DISSOLVED SOLIDS below 1800 Reg. Pool
below 3500 Salt Pool
CALCIUM HARDNESS 200 to 300
HEATING NEEDED?
Yes
No
No
IS IT POOL CLOSING TIME?
Yes
CLOSE POOL AND WINTERISE THE HEATER

TROUBLESHOOTING

Basic Troubleshooting Guide

FAULT	POSSIBLE CAUSE	ACTION
The heat pump does not run	The heat pump is not on.	Turn on the unit, verify that the circuit breaker is on.
The heat pump shuts off less than two minutes after start up	The heat pump fan is not running.	If the compressor is running, then the relay may be faulty, the fan run capacitor or the fan motor itself can be damaged.
The unit is running continuously but the desired temperature is not achieved	The unit is located in an enclosed area or where the airflow is restricted, either at the intake or the output of the energy collectors.	Remove obstacles or relocate the unit.
	The pool surface is too large for the heat pump capacity.	May need to install a larger unit, or multiple units. Multiple units should be installed in parallel, based on the sizing guide.

The Pool Heater Is Not Running Or Stops Less Than 2 Minutes After Starting Up

- Heat pump control set to low. Raise temperature set point.
- Desired water temperature is reached. Unit will automatically re-start when the water temperature drops below the set point.
- Main breaker is tripped. Reset it.
- Pool pump is not running. Turn the pool pump on.
- Filter is dirty restricting the water flow. Backwash and clean filter.

The Compressor Is Running But Not the Fan

- If the unit was just installed and the compressor starts before you have programmed the desired temperature, it is possible that the electrical hookup was made on the wrong side of the contactor (relay). Contact your electrician.
- The fan motor may be defective. Contact Waterco's service dept.

The Fan Is Running But Not the Compressor

- The unit is in its 3 or 5 minutes time delay protection mode.
- The unit is on defrost. The compressor will start again automatically when the defrost cycle is complete.

There Is Water Around the Unit

- While your Watero pool heater is in the heating mode, a large quantity of warm and humid air passes over the evaporator and causes condensation.

  It is normal to see condensation dripping under the heater.

  To verify that the water is really a water leak you will need to stop the heater and leave the pool pump running for over 5 hours. If water is still coming out of your heater after this period you should call Waterco for service.

The Heater Is Running But Desired Water Temperature Connot Be Reached

- Heat loss is too great for the heater; cover your pool as often as you can.
- Evaporator is dirty. Clean it.
- Evaporator restricted due to improper location.
- The bypass valves are not properly adjusted.

WARRANTY

LENGTH OF WARRANTY	WATERCO LIMITED WILL PAY FOR
2 years full plus 3 years pro rata warranty on all parts and labour - effective from the date of purchase. The purchase date will need to be verified on all warranty claims.	**Parts and labour to correct defects in materials or workmanship during the period of warranty.** Service must be provided by an Authorized service company.

Waterco Limited WILL NOT PAY FOR

A. Service calls to:

1. Inspect and/or correct the installation of your pool heater.
2. Instruct you on how to use your pool heater.
3. Replace house fuses or correct electrical wiring.
4. Adjust or reestablish water flow to the heater.

B. Unnecessary service calls due to erroneous problems reported.

C. Damage to your pool heater caused by accident, misuse, fire, flood, acts of God, improper installation, harsh environment, chemical feeding before the heater or improper maintenance of water chemistry as described in this manual.

D. Damage to internal piping or components due to freezing conditions.

E. Repairs to parts or systems resulting from unauthorized modification made to the heater.

F. Repairs not previously authorized by our service department.

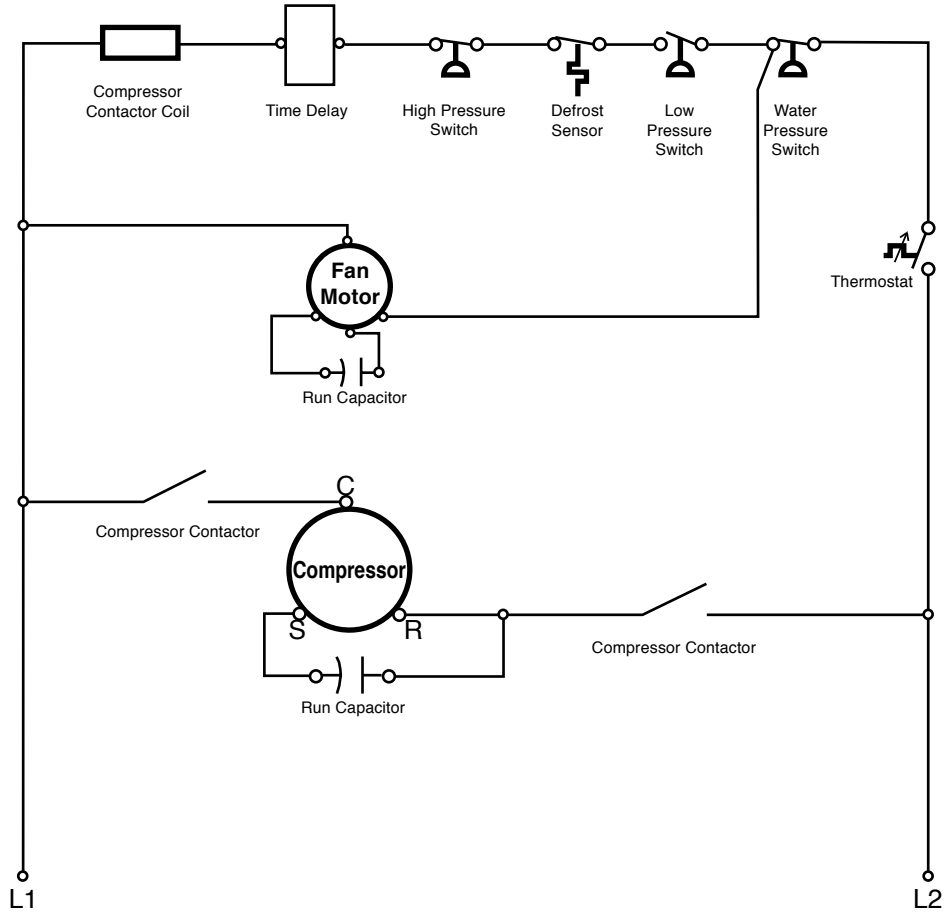
G. Parts or Heater transportation to our office.

Waterco Limited will replace or repair, at its choice, all defective parts provided that the parts are sent prepaid to our factory during the warranty period. Parts returned during the warranty period will be repaired or replaced and returned prepaid within Australia, New Zealand, and Canada by the best and most economic means of transportation.

Waterco Limited, is not responsible for direct or indirect damages resulting from defective components.

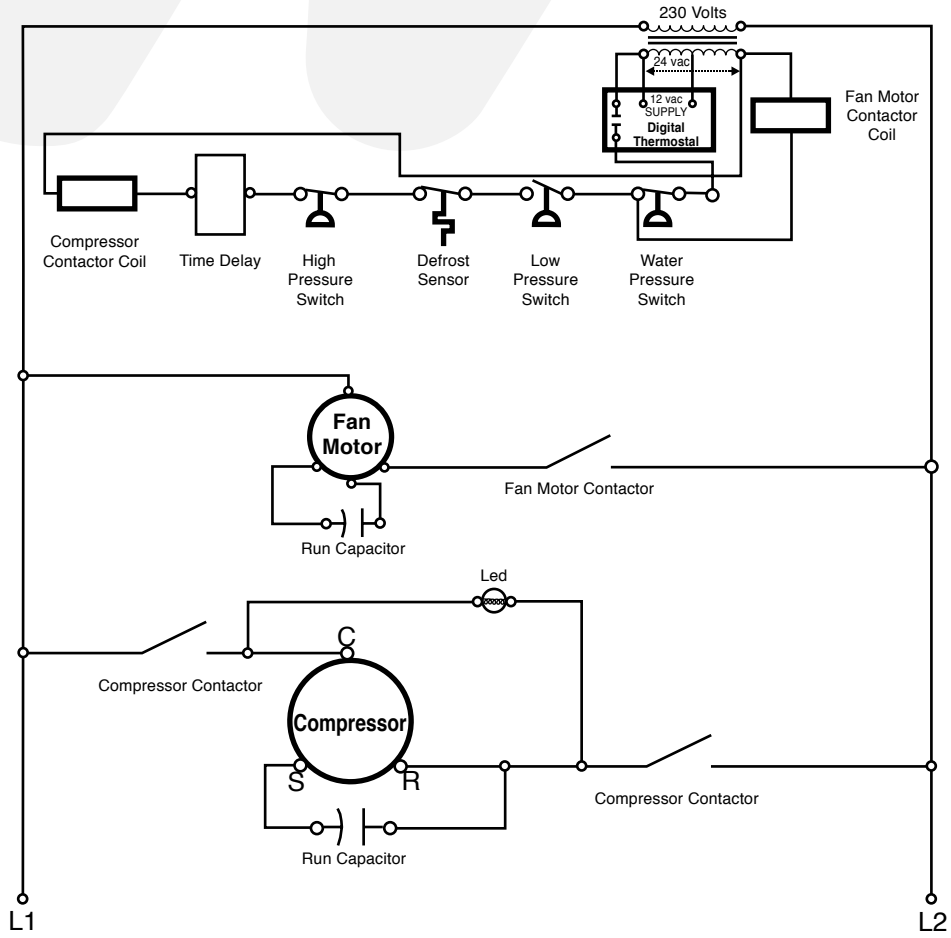
ELECTRICAL DIAGRAM

Model : Electroheat (Single Phase)
Voltage : 208-240/ 1/ 50-60



ELECTRICAL DIAGRAM

Model : Electroheat Plus (Single Phase)
Voltage : 208-240/ 1/ 50-60



ELECTRICAL DIAGRAM

Model : Electroheat Plus (Three Phase)
Voltage : 380-420/ 3/ 50-60